UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,940	08/27/2003	Jae-Woo Roh	DE-1502	8090

1109	7590	09/01/2005	EXAMINER

ANDERSON, KILL & OLICK, P.C.
1251 AVENUE OF THE AMERICAS
NEW YORK,, NY 10020-1182

EXAMINER
CHANG, AUDREY Y

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on July 22, 2005, which has been entered into the file.

- By this amendment, the applicant has amended claims 1-2, and 4-6 and has newly added claim 9.

- Claims 1-9 remain pending in this application.

Claim Objections

1.   **Claims 1-9 are objected to because of the following informalities:** .

(1) **Claim 1 has been amended** to include the feature "wherein the neighboring incident locations of reference beams on the are spaced apart from each other by certain degree for page separation" that is confusing and indefinite. Firstly, since there is only a single reference beam being generated in the earlier part of the claim, where do all the "reference beams" come from and what are these "neighboring incident locations of the reference beams" and how are they generated? Secondly, it is not clear what is this "page separation" and how does this "page separation" relate to the certain degree of beam separation. It is perhaps better to state this as "... a certain degree for separating the holographic recording of each page using one of the references beams respectively".

(2). **Claim 2 has been amended to** include the phrase "an moving the iris on a two-dimensional pane" that is confusing and indefinite.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   **Claims 1-2, 7-8 and newly added claim 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent application publication by Goulanian et al (US 2005/0122549 A1) in view of the patent issued to Tanaka et al (PN. 6,256,281).**

Claim 1 has been significantly amended and therefore necessitates the new grounds of rejection.

Goulanian et al teaches a *volume holographic data storage system* that is comprised of a *light source* (60, Figures 7 and 8) for generating a *laser beam*, a *beam splitter* (64) for splitting the laser beam into a *signal beam* (40) and a *reference beam* (74), a *spatial light modulator* (65) for modulating the *signal bean* into pixel data based on data inputted from the outside, a *beam selecting means* (83) for transmitting one of selected portions of the reference beam to thereby produce a *reduced reference beam*, a *leas* (such as 85 or 88) for *refracting* the reduced reference beam into a *storage medium* (50) and a *deflector* serves as the *reflecting means* (86) for reflecting the reduced reference beam received from the beam selecting means toward an incident location on the lens (88, please see Figures 7 and 8). Goulanian et al teaches that the beam selecting means is a *two-dimensional diaphragm or iris* (83 or 67, paragraph [0195]) that is driven by an actuator (84) so that the *size* of the reference beam can be *changed* and the reference beam can be *parallel shifted* with respect to *itself* and the *axis of the lens* (88), (please see paragraph [0198]), this means the *incident locations* of the reduced reference beams formed by selecting different portions of the reference beam (74) on the lens (88) are different from each other. The reduced reference beams having different beam specifics, (such as beam size and parallel shifted position and incident angles and locations on the recording medium), are used to record *corresponding data,* prepared by the computer (48) and inputted into the spatial light modulator, that are used to modulate the signal beam, (please see paragraph [0198] to [0199]). It is implicitly true that the reference beams having

different specifics, including different incident angle separation, would make the holographic recordings

of different data represented by the signal beams *separated* from each other so that the cross talk between

the recorded holographic data is reduced.

This reference has met all the limitations of the claims with the exception that it does not teach

explicitly that the data intended to be recorded are *digital* data that are represented as binary pixel data on

the spatial light modulator and it does not teach *explicitly* that the data being recorded are arranged in a

page-by-page format. However **Goulanian** et al does teach that the data is inputted to the spatial light

modulator and represented by the pixels of the spatial light modulator to modulate the signal beam which

implicitly suggest that the data is represented one pixel-arrangement at a time, which is essentially of

page-by-page format. **Tanaka** et al in the same field of endeavor teaches a volume holographic storage

system wherein *digital* data is intended to be recorded. Tanaka et al specifically teaches that digital data

are represented by *a* spatial light modulator (8) that is controlled by a controller (30) for modulating the

signal light beam to make the digital data capable to be recorded as holographic data. The digital data is

represented as binary coding on a page by page basis to be imparted on the signal beam (please see

column 7 lines 52-64). Tanaka et al also teaches that the different reference beams with different incident

angles and locations on the recording medium are used for recording different page of the data, (please

see Figure 1). It would then have been obvious to one skilled in the art to apply the teachings of **Tanaka**

et al to modify the system of **Goulanian** et al to inputted digital data to the spatial light modulator to

make it capable of recording digital data for the benefit of expanding the utility of the holographic storage

system.

With regard to claim 2, Goulanian et al teaches specifically that the beam selecting means is a

two-dimensional diaphragm or iris (83 or 67, paragraph [0195]) that is driven by an actuator (84) so that

the *size* of the reference beam can be *changed* and the reference beam can be *parallel shifted* with respect

to *itself* and the *axis of the lens* (88). This means the two dimensional iris is driven on a two-dimensional plane to provide the parallel shift therefore changing the incident location.

With regard to claims 7 and 8, the method for recording a holographic data is implicitly included by the system disclosure of Goulanian et al. Goulanian et al teaches that locations of the deflector or reflecting means (86) may also be changed by the actuator (87) and the direction of the signal beam may also be changed by using a movable deflector (70) that is driven by an actuator (71, Figure 7). It is implicitly true that during the holographic recording process both the position of the deflector or reflecting means and therefore the incident positions of the reference beam onto the recording medium and the reduced reference beam generated by the selecting means are changed so that different interference patterns between the reduced reference beam and the signal beam can be recorded in a systematic fashion and the holograms or the interference patterns are recoded in a spatially and angularly multiplexed fashion. The order of changing the reflecting means and changing the reduced reference beam does not change the result to the holograms being recorded.

With regard to claim 9, Goulanian et al teaches that the beam selecting means is a two-dimensional diaphragm or iris which has *transparent center region* and *non-transparent periphery region*. Although this reference does not teach explicitly that transparent center region is of a circular shape however it is either implicitly included in the disclosure or an obvious modification to one skilled in the art to make the reduced reference beam with circular beam shape.

4.   **Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent application publication by Goulanian et al and the patent issued to Tanaka et al as applied to claim 2 above, and further in view of the patent issued to Hays et al (PN. 5,777,760).**

The volume holographic memory system taught by **Goulanian** et al in combination with the teachings of **Tanaka** et al as described for claims 1 and 2 above have met all the limitations of the claims.

With regard to claims 3-4, Goulanian et al teaches to use a two-dimensional deflector (86) serves as the reflecting means (86) that is driven by an actuator (87) to reflect the reduced reference beam to the lens which serves as the second reflection mirror. This reference however does not teach explicitly to use an additional reflecting mirror (as the first mirror). But using reflecting mirror as means to redirect light beam is a common practice in the art. **Hays et al** (Figure 10) teaches an arrangement of using a first and second reflecting mirror (33 and 35) with an actuator (41) to control the position of the second mirror (33) to direct the reference beam toward the lens (37). It would then have been obvious to one skilled in the art to apply the teachings of **Hays** et al as an alternative arrangement for the hologram memory system for the benefit of have more direction control of the reference beam. It is an obvious modification to one skilled in the art to make the incident direction of the reference beam on the lens to be the same for the benefit of maintaining the incident direction of the reference beam on the recording medium. With regard to claim 6, although these references do not teach explicitly to have an actuator to control the position of the first mirror, such modifications would have been obvious to one skilled in the art for the benefit of adding add ional control to the direction of the reference beam.

Response to Arguments

5.   Applicant's arguments with respect to amended claims 1-8 and newly amended claim 9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing
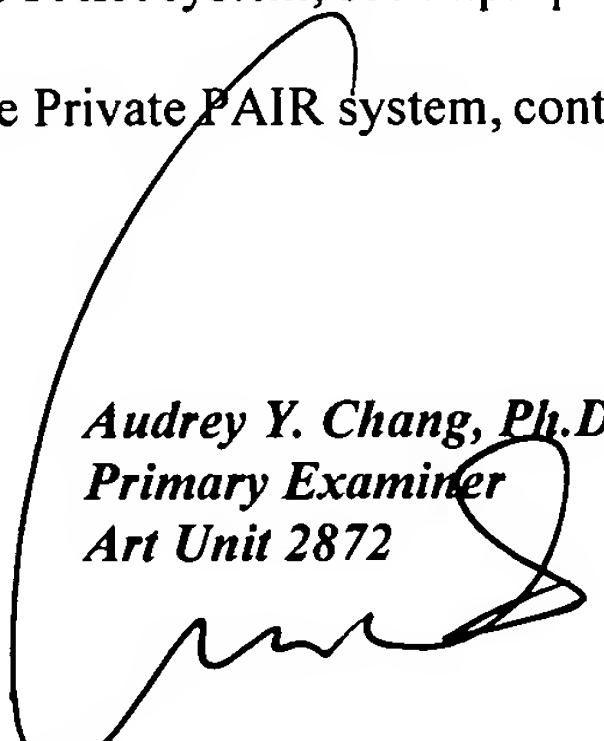
date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH

shortened statutory period, then the shortened statutory period will expire on the date the advisory action

is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX

MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should

be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally

be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew

Dunn can be reached on 571-272-2312. The fax phone number for the organization where this

application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application

Information Retrieval (PAIR) system. Status information for published applications may be obtained

from either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Audrey Y. Chang, Ph.D.
Primary Examiner
Art Unit 2872

A. Chang, Ph.D.